This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.

+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.

+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.

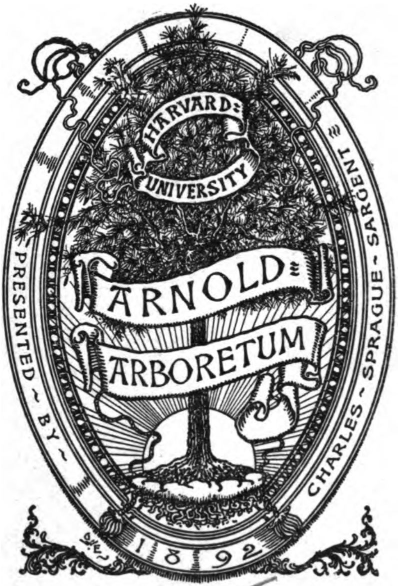
+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`

Tnd...
An 2.3

JP



~~DEPOSITED AT THE~~
~~HARVARD FOREST~~
~~1943~~

RETURNED TO J. P.
MARCH, 1967.

3E.
1479

B.D.

Anderson

Decay in Timber

To Joseph Hume Esq M.P.

to Robert Rising Esq of
Horsey
1 April 183

A
LETTER, &c.

TO THE

RIGHT HON. THE LORD DUNCANNON,

AND

THE LORDS COMMISSIONERS

OF

His Majesty's Woods and Forests,

SHEWING

THAT A GREAT PROPORTION OF THE TIMBER USED IN
SHIPPING, IS DECAYED BEFORE IT IS FELLED; AND
RECOMMENDING TO ALL PROPRIETORS OF WOOD
LANDS, TO PLANT TIMBER, AND TO KEEP IT
AND THE LAND IN PROPER CONDITION
TO PREVENT DECAY;

ALSO,

SOME REMARKS IN RELATION TO EXPERIMENTS
ON TIMBER,

BY CHEMICAL AND MECHANICAL MEANS, &c.

BY JAMES ANDERSON, Esq.
CANTERBURY SQUARE, SOUTHWARK.

Southwark:
PRINTED BY J. ROBINS & SONS, 57, TOOLEY-STREET.

1834.

— Shipbuilders &c, complain that when
logs of timber, are sawed into planks,
that they frequently find large Vacuum
containing ends or stumps of rotten
branches; the cause is, — that in genera
the branches of forest trees, are cut off in a
careless manner leaving stumps from 4 to
Inches, which decays, & the tree growing
for many years afterwards, encloses these
rotten stumps; besides the hewing off in
such a careless manner, if the branche
are large, their weight pulls away, a
portion of the trunk & bark when they fa
To prevent this, cut the branch first unde
-neath & the sides, about one third of its
thickness, before it is felled from the up
part, then smooth the stump, quite clo
to the trunk, not injuring the bark, (th
which you may leave as thin as possib
then do the part over with Tar or grease —
Prune in the Spring from the South, East
West sides cutting off not more than one, t
or three branches in one season, (accordin
to their size —
do not cut off any of the main branche
from the trunk on the Northside
The Steward or director ought to carr
pocket Compass —

* Please attend to the lopping of the trees
as directed.

TO THE RIGHT HONORABLE THE LORD DUNCANNON, AND THE LORDS COMMISSIONERS OF HIS MAJESTY'S WOODS AND FORESTS.

My Lords,

I beg leave, respectfully, to return you my grateful acknowledgments for the permission you have so kindly granted me, to experiment on timber, by natural means, in one of the Royal Forests, whereby I shall prove the efficacy of my system of *oxidizing timber without expense.* Your Lordships will observe, by my private letter of this date, that I am neither sparing expense nor trouble to procure proof of its practicability.

My object in submitting the following unarranged remarks on timber, is to attract your Lordship's attention, and also that of the proprietors of wood land generally, to the cultivation of forest timber, and to the immediate seasoning of it after it is felled. I intended to enter upon the various natural experiments I have made on trees; also to exemplify the difference of barks, oils, acids, gas, and charcoal; and to give a description of the various retort ovens I invented for my experiments; but, as patents for preventing decay in timber have been granted since I commenced those experiments, in which the patentees follow systems somewhat similar to those I have tried and rejected, and all which I consider fallacious, I am induced to be less communicative than I at first intended: besides, a mercantile man, has little taste, ability, or patience to write pamphlets. I trust I shall be excused for the brevity of the following notices of, and observations on the result of my experiments.

I have the honor to be,

My Lords,

Your Lordships' most obedient humble Servant,

Anderson

30, CANTERBURY SQUARE,
20th February, 1834.

NOTICES AND OBSERVATIONS.

I commenced experimenting on timber, first as an amusement, with very little or no theory, about the time that it was ascertained that the Lord Nelson, ship of war, had the dry rot, while on the stocks. The following observations, and short narrative of some of my experiments, are the result of the operations.

I think that every person, of common intellect, will, for the following reasons, condemn the present system of treating timber:—

In many instances timber, after it is felled, is allowed to remain for years in the woods and forests where it grew.

In the River Thames, Surrey Canal, &c. in fact, at all sea ports, you may see rafts of timber, masts, &c. lying for years in the water, and some of the rafts left dry at the recess of every tide.*

In ship builders, timber merchants, and carpenters' yards, timber is exposed many years to wet, dry, hot, and cold weathers; and lastly, a few put their timber in sheds. These, and such like practices, are the methods adopted to season timber for the building of our navy, commercial shipping, edifices, &c. and, I presume that neither our government or individual buyers know or think it necessary to enquire, when they make their contracts, ~~when the timber was felled~~, where it has been lying, or how it has been treated; nor even when it is delivered into the dock yards are those enquiries made. I have seen logs of timber intended for ship building, which externally appeared quite sound, but in the interior, regular retorts (if I may use the term) were formed; other logs were decayed in the centre, having streaks in all directions, or as the carpenters term it, "*foxey.*"

On examining some oak timber at a ship builder's yard, which had lain for years to season, I observed in it numerous rents and cracks, occasioned by the sudden changes of the atmosphere; — the evaporation not finding a sufficient vent through the pores forces its way by explosion. From these observations I am of opinion the whole of that timber was, more or less, prematurely decayed by what is termed *seasoning,* in exposing it to wet, dry, hot, and cold weathers, &c. One of the most powerful agents in destroying timber is, atmospheric air; in hot weather the heat expands and penetrates into the largest logs, and water or moisture, (which are principal agents in the decomposition of vegetable substances,) having a great affinity with the powerful concentrated acid, which thereby becomes soluble; a ferment and chymical operation ensues, separating the particles and diminishing their cohesion; whenever such an operation takes place, a gradual change and decomposition of the substance goes on, until the whole of the essential oil is destroyed. Oils, or any greasy matter, are of great utility in resisting the action of the atmospheric air, so that the plentiful use of them for the preservation of timber may be recommended.* But, it frequently happens that such matter only preserves the outside or surface, particularly of timber exposed to the atmospheric fluids, which enter in at the cracks and punctures, and carry on the decomposition in the interior, while the outside remains sound.

---

* All nautical men know the term "wind and water," and it would be nothing new to scientific men, to explain the effects of the atmospheric fluids.

I tried to remedy this evil by immersing timber in sulphuric acid and other chymical solutions, but was soon convinced none of them would preserve it. My next experiment was, by drying it in stoves or kilns, but that method only dried the sap, &c. into it, and when it became exposed to the changes of atmosphere, nearly the same chymical operations of decay ensued as before stated. †

These experiments convinced me that there was something in the component parts of timber which must be eradicated, if possible—I thought on the indestructability of charcoal, and the mode of preserving timber by charring:—

I examined some charred posts, and discovered that the post immediately above the charred part, was considerably more decayed than it was higher up, which must have been occasioned by the fire having driven a greater proportion of some destructive fluid or matter just above the charred part, which, there remaining, accounted for that part of the post being more decayed than it was higher up.*

---

* Observe the efficacy of this as demonstrated in the South Sea and Greenland fishing ships.

† This method, ineffective as it is, is preferable to the treatment at present adopted, but if too great heat is given, it will twist the planks or deals.

After examining into the component parts of timber, I was convinced that the *hydra* in it was the ACID.

To remove this, I had recourse to steam, which I conveyed into a retort oven, wherein I placed the timber, with the idea of, after having extracted the acid, to fill up the pores with oil, tar, and astringencies, which I also conveyed by pipes into the oven; this mode I found was not only extremely dangerous to the workmen employed, but brought off part of the essential oil, which was the very component I was trying to preserve undisturbed.† *The essential oil is to timber as necessary as blood is to the animal creation,* deprive it of that, and it becomes decomposed, and in fact, rotten, or fungous; as a proof observe, that a decayed or rotten piece of timber will not make any flame when put into fire, by reason of the essential oil or tar being destroyed. Observe the superiority of Riga spars, which is owing to their oily quality, also, notice the difference between white and yellow deals, the latter of which contain so much more oil.

Animalculæ, or insects, never touch or attack timber until the essential oil is perished; and it is well known, that insects of all descriptions have a great aversion to essential oils.‡

---

* These posts had been improperly charred, the ends driven into the ground had been only put into the fire, whereas to char timber properly, it ought to undergo a kind of distillation.

† I was informed afterwards, that a Mr. Lukin, tried an experiment at Woolwich, on a somewhat similar plan by having a retort filled with saw dust, the tar of which he meant to convey into the oven which contained the timber, but not taking the precaution to have safety valves, an explosion took place, which killed six of the workmen, wounded fourteen, two of whom shortly afterwards died, demolished the wall of the dock yard, part of which was thrown to the distance of 250 feet;—an iron door weighing 280 lbs. was also driven to the distance of 230 feet.

‡ A patent was lately taken out for immersion of timber in corrosive sublimate; observe my first experiment was by sulphuric acid, the addition of mercury would only injure the health of the ship's company. Some may remember the effects of that noxious metal on board the Inconstant Frigate, bound to Vera Cruz, and several other instances in merchant's ships.

My fourth experiment was by dry distillation, by means of an iron cylinder, which burnt the products. The oils of the various vegetable matters distilled, had all the smell of common coal tar; therefore, concluding that I should not arrive at any proper method until I was able to extract the component parts properly, I applied to several able chymists, whom I found equally ignorant with myself of the right process.

My fifth experiment was in the country, by kilns, that system I persevered in for a considerable time; some of the kilns however burst, others fell in, but, notwithstanding my defeat in the object I was endeavouring to accomplish, these experiments enabled me to discover the proper mode of charring timber for common purposes; and, also, a new method of distilling the acid, &c. and to make a superior charcoal without the aid of iron cylinders, which, in addition to their defects, are very expensive, and have been the cause of powder mills exploding, from a portion of corroded iron getting mixed with the charcoal.*

Having some knowledge of the art of tanning, and knowing that a green ox hide will putrify in a very short time, if nothing is applied to it; but that when purified and tanned, its identity is destroyed, and it becomes another article, *leather*, which is indestructible by age, I conceived that timber might be treated in the same manner, and resolving to have another trial, I rented a tan yard in Bermondsey, built a retort oven, and at last, succeeded in extracting nearly all the acid, without disturbing the oil or tar, or scorching the timber; I afterwards put it through the process of tanning, using strong hot liquors. I tried several other methods, without first taking out the acid, *and observed all the changes produced with astringencies*, and found it was productive of but little benefit to the timber, besides the expense and time required to tan, induced me to give it up as a fallacy.†

---

* All water casks on board of ships, ought to be well charred in the inside, and slightly each time they are refilled, it will preserve the water from corruption; also, if wine or beer casks, &c. were charred, it would preserve the liquid from acidity. Any labourer can make and work the simple machine I invented for distilling the acid, &c. which will be found of great service in various manufactories. It will be also beneficial as well as amusing for noblemen and gentlemen to have on their estates.

† I filled the retort oven with spent bark or tan, and found, that except the astringent principle or tanen, it had lost none

Particulars of my last experiment, by which I succeeded in discovering the best method of seasoning timber—how I purified the tar and oil I employed; likewise of a machine I invented, to saturate the timbers, &c. of any ship under repair in dock, &c.* I shall at a proper season communicate to the Right Honorable Lord Duncannon, and the Lords Commissioners of His Majesty's Woods and Forests.†

I have been informed that timber used formerly to be barked, in the County of Sussex, and allowed to remain two or three years before it was felled; but that plan was found not to answer, as it was often liable to rend and crack from top to bottom, and to speedily decay. In some parts abroad, they sink their rafts of timber under water; and I have been told, that our government has adopted a plan of putting it under ground; these are the only methods besides the common way of exposing it to the atmospheric fluids, that I am aware of, that have been in use since the time of Julius Cæsar, who complained of his ships getting so soon rotten; but certainly there was greater care, or better means used formerly, than within these last fifty years. I can remember hearing of good strong sea-worthy vessels being three or four times the age of those built within the latter period. What a sacrifice of property to ship owners? for, if their fine new ships, even escape premature decay, or dry rot, yet so bad in general is the quality of the timber of which they are built, that in a very few years, say seven to nine, they are no longer rated as A 1, or first class.

During the period I was trying mechanical and chy-

---

of the other component parts; and I am of opinion that the many thousand tons to be had for nothing, in the parish of Bermondsey, could be turned to a good account for various purposes.

* I was led to the invention of this machine in consequence of being informed by a naval officer that he was nearly suffocated by hydrogen gas, from the coal tar, forced by pumps among the timbers of a ship under repair in the dock at Sheerness.

† A quick method of seasoning timber would (besides the benefit to the timber,) be a great saving to ship builders and timber merchants, in not lying so long out of their capital. Timber ought to be removed from the woods and forests immediately after it is felled, and not exposed to the changes of atmosphere; and for common purposes, it would be well to char it by close combustion, using tar, &c. All tar ought to be purified by ship builders, rope makers, &c. the simple method I adopt, clears it from acid and other impurities.

mical experiments, I endeavoured to find out a natural remedy against decay; and after great difficulties, I succeeded in 1830, to produce timber equal in durability, to the famed Riga Spars.

In March, 1831, I read Mr. Hume's statement in the House of Commons, "that the building of ships for the navy had cost thirty millions of pounds sterling, since 1816, (in a time of peace!)" Although this declaration surprised and vexed me, feeling convinced, that if my system was adopted, three-fourths of such an immense sacrifice of property would be saved; yet, having expended many thousands of pounds in experiments, without any encouragement, or even thanks, I was not urged by it to pursue my experiments, and did nothing further until the beginning of last year when a Captain, to my address, stated, that his ship had the dry rot, although it was only three or four years old; this induced me again to persevere, but being aware that if I produced a piece of oxidized timber *without evidence* that it had been oxidized by me, it would not be attended to, I applied to the Lords Commissioners of His Majesty's Woods and Forests for permission to make an experiment in one of the Royal Forests, which request was kindly acceded to.

I was astonished to find that in one of the Royal Forests, the greater part of the trees were decayed and foxey, which fact, astonishing as it may be, can be corroborated by a good practical judge. No wonder then we have rotten ships, the timber being partly decayed before it is felled; and that decay greatly accelerated, as I have before stated, by the system of seasoning.

It is now no longer a mystery how ships prematurely decay;—in many instances, even before being launched; neither is it a mystery what has been the matter, of late years, with our once famed English Oak, formerly held in such high estimation for durability.

The cause of decay in Forests is evident the want of sufficient air, draining, &c. Some years ago I wrote a letter, which I intended to send to the Lords Commissioners of His Majesty's Woods and Forests, stating to them, that Epping, Waltham, and Hainult Forests were shelters for thieves, and the commission of crime; also, pointing out the benefit that would arise from cultivating and having a Forest of good timber, besides the giving employment to poor agricultural labourers, &c. however, my ideas were anticipated by MONTAGUE BURGOYNE,

I I did apply to the Lords of the admiralty, to
[illegible] to try an experiment before proper officers

Esq. in a letter addressed by him to the Lords Commissioners of Woods and Forests, but I have not heard of any measure or motion to carry his suggestions into effect. In one particular I went farther than that gentleman, which was, to extract the acid, &c. from the roots in the forests, without the aid of iron cylinders; the produce of which, with the charcoal, I venture to assert would nearly pay the whole expense of cultivating, or re-planting, besides effecting the great object I had in view—the giving employment to the poor. I sincerely hope that the Lords Commissioners will again bring the matter before Parliament, and take measures to allot, cultivate, replant, &c. the great extent of waste land laying within a few miles of London: there may probably be some objections relating to forest rights, and the Lord of the Manor's claim, if so, let those interested have such a proportion of ground, as shall be deemed a fair compensation.

In my next, I shall explain how trees can be oxidized (as I shall term it), so as to preserve timber for a century, without expense, and with little trouble; although the process requires to be acted upon a few years before the timber is felled, yet, (besides the durability) the saving to timber merchants, ship builders, &c. will be great, in not having to lay out of their capital so long as they are obliged to do by the present mode of seasoning; and when this system is generally adopted, the proprietors of wood land will have a succession of trees ready to fell every season.

In the mean time, I recommend to all proprietors of wood land, to have their trees properly pruned, to clear them from ivy, moss, brushwood, and suckers; to destroy may-bugs, and other vermin; make drains where water lodges, fill up holes made by rabbits, &c. I also recommend them to attend to the following sentences:—

"A young planter may live to reap much reward from his labour, or he may leave a valuable inheritance to his children."

"One gentleman planted as much timber in his lifetime, worth fifty thousand pounds; but this spirit has too little prevailed for many years, and the deficiency (and bad quality) of timber is an increasing evil."*

"The plantation and care of timber is like buying the reversion of an estate; for a little money expended we become heirs to great sums."

---

* Marshall on Gardening.

"Herbs grow in pence, and shrubs in shillings, but timber in pounds."

The query naturally arising out of these quotations is, How is it that this deficiency of planting timber, and in attention to its growth arises?

The answer is, that after the French Revolution, the prices of wheat, and other grain having got up to such an enormous rate, the great and quick return of money consequent thereon, distracted the attention of our landed proprietors from cultivating their plantations, or taking care of the timber on their estates: which also had the effect of driving away the cottager from his home, to seek shelter in our large towns, and add to the increase of pauperism: let our industrious agricultural labourers have a small allotment of the fifteen millions of uncultivated acres of land in the British dominions, and let us consider besides, what might be done with the sixteen millions termed unprofitable acres. There is plenty of employment for all the poor, if our rich land proprietors would only encourage the cultivating, planting, and beautifying of our own country, without the banishment (or emigration as it is termed,) of so many of our poor to inhospitable shores, there to starve, or do how they can, no matter, so they are got rid of.

I must apologise for digressing so far from my subject, and shall conclude by enquiring of our old worthy admirals, and nautical men in general, also of merchants and ship owners—where was there such a gratifying view, as, in the war time, to behold a convoy of the wooden walls of Old England guarding a numerous fleet of valuable merchants' ships, departing to or arriving from foreign climes? But what a melancholy retrospection! how grand and magnificent the sight, yet how short your durability! The millions of money you have cost, are in a few years lost to the country, and to the individual owners—what a saving, if such an immense property could be preserved, even for fifty years; and yet not one of the able natural or chemical philosophers of Europe have written upon the subject. Let me indulge in the hope, that the foregoing observations will induce noblemen and gentlemen to give orders to their stewards, &c. to attend more to their forest trees, which will assist in remedying the evil complained of, and in preserving so much property; it being universally allowed that ships are the means of the prosperity of all maritime countries, and the safe-guard of England.

ROBINS AND SONS, PRINTERS, 57, TOOLEY-STREET.